TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

November 15, 2006

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor
Joe Helfrich, Environmental Scientist III, Team Lead

FROM: SC Steve Christensen, Environmental Scientist II

RE: Lease Addition U-024316, U-46484, U-61048 and U-61049, Task ID #2680, CO-OP Mining Company, C/015/0025

SUMMARY:

On July 21st, 2005, COOP Mining Company (the Permittee) submitted an application to extend the Bear Canyon Permit boundary by adding 60 acres to lease U024316, 2,196.09 acres to lease U-61409, 1,400 acres to lease U-46484, 1,108.27 acres to U-61048 and 2,740.00 acres of private property (Mohrland Addition). The application is considered a major revision to the current MRP due to the extensive size of the proposed area additions (approximately 7,504 acres).

The Division of Oil, Gas and Mining (the Division) performed a technical analysis of the submittal and a letter outlining the deficiencies of the application was sent to the Permittee on February 1st, 2006 (Task ID# 2292). On May 21st, 2006, the Division received the Permittee's response to the deficiency letter. The Division performed a subsequent second round of technical analysis and a letter outlining the outstanding deficiencies was sent to the Permittee on July 13, 2006 (Task ID #2526). The Permittee responded to the second round of deficiencies on August 9th, 2006. The Division review of that response was assigned Task ID #2597. The Permittee provided the Division with their response to Task ID #2597 on October 30th, 2006.

The following memo is the 4th round of hydrologic analysis for the Bear Canyon Lease Expansion as it relates to the hydrology discipline of the R645 State of Utah Coal Mining Rules.

Hydrologic information provided in the application does not meet the requirements of the Coal Mining Rules. The proposed amendment should not be approved until the following deficiencies are addressed:

R645-301-121.200, -121.300, -150: Clear and Concise, Completeness

- Prior to permit approval, the Permittee needs to provide the Division with a copy of the entire MRP with all of the proposed mine plan changes identified during the permitting process. The changes should be provided in red line strikeout for reviewing purposes.

Considering the number of iterations and revisions of the MRP during this permitting process, a final submittal in this format is necessary in order to determine whether the application is clear, concise and complete.

- On Page 7-26 of the MRP, the sub-section entitled "Site Selection" should be changed to make it apparent to the reader that the selected sites are groundwater-monitoring sites.
- On Page 7-36 of the MRP, the sub-section entitled "Site Selection" should be changed to make it apparent to the reader that the selected sites are surface water monitoring sites.

R645-301-724: Baseline Information

- In order for the MRP to clearly identify the sites that will be utilized for baseline data collection (versus sites utilized for operational data collection), the Permittee should produce separate tables that identify the ground and surface water sites that will be utilized for the collection of baseline data. Each table should outline the timeline for baseline data collection as well as provide page references to where the parameters that will be analyzed for are listed.

R645-301-728: Probable Hydrologic Consequences Determination

- The Permittee should clarify the discrepancy between the 2nd sentence of the 4th paragraph on page 7-44A where it's stated that the "MW-116 is only 2 feet lower in head pressure then MW-117" with the depiction of the potentiometric surface of the Spring Canyon sandstone on Plate 7J-2, General West East Cross Section East Portion of Federal Lease U-024316. Upon inspection of Plate 7J-2 it appears that the potentiometric surface depicted at MW-116 is higher than MW-117. The water level values depicted on Plate 7J-2 appear to be correct (7,746' at MW 117 and 7,744' at MW 116), however; the hatched potentiometric surface line appears higher at MW 116 then at MW 117.

- Upon reading and reviewing Appendix 7J, it's not clear as to whether the baseline data obtained from the various water resources in the proposed expansion area have been analyzed for the proposed lease expansion. The Permittee needs to use baseline data and discuss specific impacts to specific ground and surface water resources in the proposed permit expansion area. The proposed expansion area includes several perennial drainages as well as springs supplying base flow to these drainages. The Permittee needs to specifically discuss the potential for these resources to be impacted by mining. The PHC document in Appendix 7J does not do this. (See PHC Section for additional comments)

R645-301-731.210 and –731.220: Ground and Surface Water Monitoring

- The Permittee should clarify the sampling duration/frequency to be performed during the operational phase of mining activity. Specifically, the Permittee needs to alter the Sampling Duration language under Operational Monitoring in Table 7-12, Ground Water Sampling, on page 7-51 and in Table 7-16, Surface Water Sampling, on page 7-58 to

show that the proposed monitoring includes four sampling events per year (as shown in Table 7-14).

- The Permittee needs to update Table 7-14 as well as related text portions in the ground and surface water monitoring sections of the MRP to reflect the addition of the monitoring points identified in the respective Ground and Surface Water monitoring sections of this analysis (See Below).

R645-301-731.210: Ground Water Monitoring:

- The Permittee should include ground water sites SBC-16, SBC-16A and SBC-16B to the list of sites slated for increased monitoring during the undermining of Fish Creek. The sites should reflect their increased monitoring status in Table 7-14 as well as on page 7-56 of the MRP.

- The Permittee should add the following locations to their ground water monitoring program. Table 7-14 as well as related text portions in the surface and ground water monitoring sections of the MRP should be up-dated to reflect these additional monitoring points:
    - South McCadden Trough-located in the T 16S R7E SE ¼ of the SW ¼ of Section 11as depicted in Figure 7-0, Forest Service Protected Water Resources. The Permittee should address discrepancy between Figure 7-0 and the text on page 7-61A. Page 7-61A states the South McCadden Trough as being monitored with site SMH-1. However, the location of SMH-1 as depicted on Plate 7-4 does not correlate with the location of the South McCadden Trough as depicted on Figure 7-0.
    - Historical monitoring location FBC-12.

- The Permittee should address a discrepancy on Plate 7-4 as it relates to monitoring site SBC-12 (16-7-13-1). Plate 7-4 depicts a historical monitoring point directly south of SBC-12 (16-7-13-1) identified as 16-7-13-1 in green type.

R645-301-731.220: Surface Water Monitoring:

- The Permittee should add the following location to their surface water monitoring program and make respective changes in Table 7-14 as well as the related text portions of the surface water monitoring section of the MRP:
    - A stream monitoring location in McCadden Hollow up-stream of spring SMH-4 and south of historical monitoring site 16-7-12-6.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Baseline Information

The application does not meet the hydrology Environmental Description for Baseline Information requirements as provided in **R645-301-724**. Pages 7-26 and 7-36 of the submittal outline the monitoring and data collection commitments provided by the Permittee for groundwater and surface water respectively. In each instance, the Permittee has committed to obtaining three years of baseline data, which well exceeds the minimum requirements provided by law. In addition, the Permittee has committed to following the Division recommended list for baseline parameters.

In order for the MRP to clearly identify the sites that will be utilized for baseline data collection (versus sites utilized for operational data collection), the Permittee should produce separate tables that identify the ground and surface water sites that will be utilized for the collection of baseline data. Each table should outline the timeline for baseline data collection as well as provide page references to where the parameters that will be analyzed for are listed.

State Appropriated Water Rights

The application meets the hydrology requirements for Environmental Description of State Appropriated Water Rights as provided in **R645-301-724.100 and –724.200**.

Table 7-6 of the MRP on pages 7-32 thru 7-33B provides a comprehensive list of the state appropriated water rights within the existing permit area as well as in the proposed lease expansion area. The table lists the water right number, the owner of the water right, the priority date, a legal description of the place of use, a description as to the type of diversion as well as the nature of use.

Plate 7-12: Water Rights depicts the locations of the water rights identified in Table 7-6. In addition, Plate 7-12 depicts the extent of point-to-point diversions for the state appropriated water rights that are utilized in that manner.

Probable Hydrologic Consequences Determination

The application does not meet the Probable Hydrologic Consequences (PHC) Determination requirements as provided in **R645-301-728**. Appendix 7-J contains a report compiled by Mayo and Associates, LC in June 2001. The report, *Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Groundwater Monitoring*, describes the surface-water and groundwater systems of the existing mine lease, as well as the Wild Horse Ridge Area and the Mohrland area.

Upon reading and reviewing Appendix 7J, it's not clear as to whether the baseline data obtained from the various water resources in the proposed expansion area has been analyzed for the proposed lease expansion. The Permittee needs to use baseline data and discuss specific impacts to specific ground and surface water resources in the proposed permit expansion area. The proposed expansion area includes several perennial drainages as well as springs supplying base flow to these drainages. The Permittee needs to specifically discuss the potential for these resources to be impacted by mining. The PHC document in Appendix 7J does not do this.

For example, in section 9.1.1, possible adverse impacts to the hydrologic balance are discussed relative to groundwater. In this section, several springs are identified and discussed in regard to potential mining related impacts, yet none of the springs identified are within the proposed expansion area. The section discusses springs SBC-9, SBC-10, SBC-7, 16-7-24-3, SBC-176, Big Bear Spring, Birch Spring Defa #1, Defa #2 and SBC-14. None of these springs is located within the proposed permit expansion. In addition, on page 37 of Appendix 7J section 4.1.6 discusses the Star Point Sandstone Springs. It is unclear as to whether any springs issue from this geologic unit in the proposed expansion area as; again, all the springs identified in the discussion are located within the current permit area. No discussion is provided for springs located in the proposed expansion area.

Another example as to how it's confusing as to whether the baseline data has been analyzed for the proposed lease expansion is on the top of page 129 where it's stated, "Springs in and adjacent to the proposed permit area which discharge from the lower Blackhawk Formation include SBC-7 in the current permit area, and 16-7-24-3 and SBC-17 in the permit expansion area". Springs 16-7-24-3 and SBC-17 are located within the current permit area and not in the permit expansion area.

Page 133 states, "If coal mining recommences in the Hiawatha Seam workings, there is a potential for water to upwell from the Spring Canyon Sandstone if mining occurs where the elevation of the coal seam is below the elevation of the potentiometric surface of the Spring Canyon Sandstone". This sentence contradicts the assertion by the Permittee that the PHC document in Appendix 7J adequately evaluates mining in the proposed lease expansion area. If

the PHC analysis in Appendix 7J was performed for the proposed expansion, it seems logical that the author would've known that the Hiawatha coal seam was slated for mining.

Section 9.1.2 discusses Surface Water and potential mining related impacts. Page 136 of Appendix 7J discusses how "the mine plan for the current permit area and the Wild Horse Ridge permit expansion area have been designed to prevent subsidence of Bear Creek, the right fork of Bear Creek, or the Left Fork of Fish Creek." The Right Fork of Fish Creek isn't even mentioned. The paragraph goes on to say "However, the hydrologic balance of these systems would be impacted if ground water discharge that provided base flow for these systems were impacted". Several springs have been identified that provide base flow to perennial sections of both forks of Fish Creek that will be undermined by the proposed mining expansion, yet they are not discussed in the PHC. Potential impacts to these springs should be thoroughly reviewed. If no impacts are anticipated, provide a basis and support for that conclusion.

Page 7-44A states, "upwelling from the Spring Canyon Sandstone will occur in the Hiawatha seam workings, but de-watering of the Spring Canyon Sandstone will not have any adverse impacts". The Permittee does not expand on what basis this assertion is made and evidence supporting this claim is not apparent in the PHC document in Appendix 7-J.

Page 7-44C discusses the mine water usage in connection with the Mohrland discharge. The 3rd sentence of the 2nd paragraph states, "When mining begins in the Hiawatha seam, the Mohrland discharge will be intercepted and this water will be used." There is no discussion as to the impacts on Cedar Creek when all of the Mohrland discharge water is utilized when the longwall panel comes on line in approximately 2013.

On page 7-44A, the Permittee should clarify the 2nd sentence 4th paragraph where it's stated that the "MW-116 is only 2 feet lower in head pressure then MW-117". Upon inspection of Plate 7J-2, General West East Cross Section East Portion of Federal Lease U-024316, it appears that the potentiometric surface depicted at MW-116 is higher than MW-117.

On page 7-44A, the Permittee identifies a potential for escarpment failure to reach the Left Fork of Fish Creek. The escarpment failure would cause a temporary increase in the sediment reaching the drainage. In the event that large fragments of rock or boulder were to reach the channel of the Left Fork of Fish Creek, the Permittee would be required to mitigate the impacts. There is a potential for surface cracks to form under perennial reaches of the Left and Right Fork's of Fish Creek. Although the overburden ranges from 800-1,000 feet in this area, due to the alignment of the longwall panels and safety barricades, there is a potential for subsidence related impacts to reach the surface. Due to the amount of overburden in the area, the potential for subsidence related fracturing to reach the surface is minimal. However, tension cracks at the surface could intercept perennial flow from these drainages. In this instance, the flow would likely flow subterranean for a short distance before encountering an impervious layer and subsequently finding it's way back to the surface.

Page7-45 provides the calculations for the estimated total water loss from mining activity with the addition of the proposed lease expansion. The estimated value for total maximum water loss is approximately 69 acre-feet per year.

Groundwater Monitoring Plan

The application meets the hydrology Environmental Description for Groundwater Monitoring requirements as provided in **R645-301-724.100**. The Permittee has committed to collecting 3 years of baseline data on water resources that could potentially be impacted by mining activity. Plate 7-4 depicts the proposed monitoring sites. Upon comparing Plate 7-4 with the mine workings maps (Plate 5-1A Blind Canyon Seam Workings, Plate 5-1B Hiawatha Seam Workings and Plate 5-1C Tank Seam Workings) and upon several field visits in the proposed lease expansion, the Permittee has produced a monitoring plan that will adequately quantify and monitor groundwater resources in the area. The Division recommended list for baseline parameters will be followed which exceeds the minimum required by law. In addition, every five years baseline parameters will be collected. The remainder of the time, field readings will be collected.

Surface-Water Monitoring Plan

The application meets the hydrology Environmental Description for Surface-Water Monitoring Plan requirements as provided in **R645-301-724.200**. The proposed permit area contains the headwaters of all the perennial streams that could be affected by underground mining activity. As such, the major groundwater sources providing base flow to these drainages are to be monitored. In addition, surface water monitoring sites have been selected at all major confluences and at other points of interest as identified by various stakeholders (water rights holders, USDA Forest Service etc...). The parameters to be tested for and the schedule to be followed is based on the probable hydrologic consequences (PHC) as outlined in Appendix 7-J. Three years of baseline data will be collected which exceeds that required by law. The Division recommended list for baseline parameters will be followed which also exceeds the minimum required by law. Sampling will be primarily achieved through field parameters with a full suite of baseline data collected every five years.

Findings:

Hydrologic information for the Hydrologic Resource Information regulations does not meet the minimum requirements of the State of Utah R-645 Coal Mining Rules relative to Baseline Data Information and Probable Hydrologic Consequences Determination.

- In order for the MRP to clearly identify the sites that will be utilized for baseline data collection (versus sites utilized for operational data collection), the Permittee should produce separate tables that identify the ground and surface water sites that will be utilized for the collection of baseline data. Each table should outline the timeline for

baseline data collection as well as provide page references to where the parameters that will be analyzed for are listed.

- The bottom line is this, the raw data for the Gentry Mountain/Mohrland areas presented in Chapters 1-8 of Appendix 7J need to be analyzed and incorporated into the PHC and other sections of Appendix 7J need to be updated with new and pertinent information relative to the permit expansion area presently under consideration. Upon reading and reviewing Appendix 7J, it's not clear as to whether the baseline data obtained from the various water resources in the proposed expansion area have been analyzed for the proposed lease expansion. (See PHC Section for further comment)

- On page 7-44A, the Permittee should clarify the 2nd sentence 4th paragraph where it's stated that the "MW-116 is only 2 feet lower in head pressure then MW-117". Upon inspection of Plate 7J-2, General West East Cross Section East Portion of Federal Lease U-024316, it appears that the potentiometric surface depicted at MW-116 is higher than MW-117.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Monitoring and Sampling Location Maps

The application meets the hydrology requirements for Maps, Plans and Cross Sections of Resource Information for Monitoring and Sampling Location maps as provided in **R645-301-722** and -731. Plate 7N-2 depicts water-sampling locations utilized in acquiring baseline data. In addition Plate 7-4 depicts historic monitoring points that were also utilized in the collection of baseline data for the proposed lease expansion area.

Subsurface Water Resource Maps

The application meets the hydrology requirements for Maps, Plans and Cross Sections of Resource Information for Subsurface Water Resource Maps as provided in **R645-301-722**. Plate 7-12 depicts the state appropriated water rights for both the existing permit area as well as the proposed lease expansion. Upon inspection of the State of Utah Water Rights database, it appears that all state appropriated surface water rights are depicted on Plate 7-12. Plate 7-4 identifies the subsurface water resources within the existing permit area as well as the proposed lease expansion.

Surface Water Resource Maps

The application meets the hydrology requirements for Maps, Plans and Cross Sections of Resource Information for Surface Water Resource Maps as provided in R645-301-722. Plate 7-12 depicts the state appropriated water rights for both the existing permit area as well as the proposed lease expansion. Upon inspection of the State of Utah Water Rights database, it appears that all state appropriated surface water rights are depicted on Plate 7-12. Plate 7-4 identifies the surface water resources within the existing permit area as well as the proposed lease expansion..

Findings:

Hydrologic information for the Maps, Plans and Cross Sections of Resource Information regulations meets the minimum requirements of the State of Utah R-645 Coal Mining Rules.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Surface and Groundwater Monitoring

The application does not meet the hydrology Operation Plan requirements for Surface and Groundwater Monitoring as provided in **R645-301-731.210 and –731.220**.

The Permittee should clarify the sampling duration/frequency to be performed during the operational phase of mining activity. Specifically, the Permittee needs to alter the sampling duration language under Operational Monitoring in Table 7-12, Ground Water Sampling, on page 7-51 and in Table 7-16, Surface Water Sampling, on page 7-58 to show that the proposed monitoring includes four sampling events per year (as shown in Table 7-14).

Various stakeholders identified several water resource sites during this process (during sit down discussions as well as field visits) that weren't initially included in the proposed monitoring plan. The Permittee has incorporated these additional sites into their proposed water-monitoring program. These sites include: springs SBC-16A and SBC-16B located in T 16S R8E Sect 13 NE ¼ NW ¼, Wild Horse Spring (SBC-22) located in T 16S R7E Sect 13 SE ¼ SE ¼ and Bear Canyon Spring (SMH-5) located in T 16S R7E Sect 12 NE ¼ SW ¼. These additional sites are listed in Table 7-14 as well as depicted on Plate 7-4.

Upon the approval of the proposed lease expansion, monitoring will begin on the additional ground and surface water monitoring sites identified during the permitting process. Three years of baseline will be collected on all additional sites added after 2001 (page 7-49).

On page 7-60A, the Permittee describes the surface and groundwater monitoring procedures that will be utilized during undermining of the upper reaches of the Left and Right Forks of Fish Creek. The Permittee has committed to weekly monitoring of the areas one month prior to mining in the area. The weekly monitoring will continue until one month after mining has left the area. Monitoring will then be reduced to once a month after mining has left the area. Monitoring will then be reduced to once a month for an additional 6 months at which time, monitoring will fall back to a quarterly schedule. During the weekly monitoring, the Permittee will submit weekly reports to the Division via e-mail. The actual start time of the weekly monitoring will be determined based on continual underground surveying that is required by MSHA. Five sites have been identified for weekly monitoring during the undermining phase of the Left Fork of Fish Creek with five sites slated for weekly monitoring on the Right Fork of Fish Creek. See Table 7-14 for a listing of the sites and Plate 7-4 for their respective locations. The sites slated for weekly monitoring on each of the drainages encompass both surface and groundwater sampling sites. In addition, upon field inspections, areas where perennial flow began for both the Left and Right Forks of Fish Creek were focused on and representative sampling sites in these areas were incorporated into the weekly monitoring program. The increased monitoring will include sites FC-2, FC-3, FC-4, FC-5 and SCC-2 for the Right Fork of Fish Creek. The Left Fork of Fish Creeks weekly monitoring sites include FC-1, FC-6, SBC-18, SBC-20 and SBC-21.

Groundwater Monitoring

The application does not meet the hydrology Operation Plan requirements for Groundwater Monitoring as provided in **R645-301-731.210**.

The Permittee should include ground water sites SBC-16, SBC-16A and SBC-16B to the list of sites slated for increased monitoring during the undermining of Fish Creek. The sites should reflect their increased monitoring status in Table 7-14 as well as on page 7-56. Due to their base flow contribution and close proximity to the Left Fork of Fish Creek, the sites should be included in the weekly monitoring regimen to be implemented during longwall mining of panels 3, 4 and 5 as depicted on Plate 7-4.

In addition, the USDA Forest Service has identified several protected ground water sites that should be monitored by the Permittee. Table 7-14 as well as related text portions in the ground water monitoring sections of the MRP should be up-dated to reflect these additional monitoring points. The additional sites are as follows:

- South McCadden Trough-located in the T 16S R7E SE ¼ of the SW ¼ of Section 11as depicted in Figure 7-0, Forest Service Protected Water Resources. The

Permittee should address discrepancy between Figure 7-0 and the text on page 7-61A. Page 7-61A states the South McCadden Trough as being monitored with site SMH-1. However, the location of SMH-1 as depicted on Plate 7-4 does not correlate with the location of the South McCadden Trough as depicted on Figure 7-0.

- Historical monitoring location FBC-12.

The Permittee should address a discrepancy on Plate 7-4 as it relates to monitoring site SBC-12 (16-7-13-1). Plate 7-4 depicts a historical monitoring point directly south of SBC-12 (16-7-13-1) identified as 16-7-13-1 in green type.

Groundwater monitoring sites were selected because they were either major contributors to surface water systems, or they were springs that have been developed for beneficial use or have water rights assigned to them. The major contributors to surface water systems in the proposed lease expansion are SMH-3, SMH-4, SBC-12, SBC-18, SBC-20, SBC-21, SCC-1, SCC-3 and SCC-5. Perennial portions of the streams fed by sites SCC-5, SCC-2, SBC-20 and SBC-21 will be undermined. As such, these sites will be monitored for flow weekly starting one month prior to undermining and continuing until one month after undermining at which time they will be monitored monthly for six months before returning back to quarterly monitoring. See Table 7-14. (See previous paragraph's comments regarding sites to be added to the increased monitoring schedule during the undermining of perennial streams)

Various stakeholders identified several groundwater resource sites during this process (during sit down discussions as well as field visits) that weren't initially included in the proposed monitoring plan. The Permittee has incorporated these additional sites into their proposed water-monitoring program. These sites include: springs SBC-16A and SBC-16B located in T 16S R8E Sect 13 NE ¼ NW ¼, Wild Horse Spring (SBC-22) located in T 16S R7E Sect 13 SE ¼ SE ¼ and Bear Canyon Spring (SMH-5) located in T 16S R7E Sect 12 NE ¼ SW ¼. These additional sites are listed in Table 7-14 as well as depicted on Plate 7-4.

Table 7-14 Water Monitoring Matrix: Operational Phase of Mining on page 7-53 provides a comprehensive list of all the proposed monitoring sites. Plate 7-4 Water Monitoring depicts the locations of the monitoring sites.

Surface Water Monitoring

The application does not meet the hydrology Operation Plan requirements for Surface Water Monitoring as provided in **R645-301-731.220**.

As discussed between the Permittee, representatives of the USDA Forest Service and the Division on August 31, 2006, a surface water-sampling site should be established in the upper reach of McCadden Hollow. As the Blind Canyon coal seam will be mined directly underneath this area, it was determined by the USDA Forest Service that a site be established up-stream of SMH-4 and south of historical monitoring site 16-7-12-6.

Surface water monitoring sites were selected based on the conclusions of Appendix 7J (PHC determination document) as well as upon the field investigations that were performed by during the course of the permitting process by regulating agencies and various stakeholders.

Page 7-57 lists the streams that will be monitored during the operational phase of the mining activity. A total of 8 more surface water-monitoring sites were added to the proposed monitoring program in light of the proposed lease expansion. Two sites were added to Cedar Creek (CK-1 and CK-2) with four additional sites added to the Right Fork of Fish Creek (FC-2, FC-3, FC-4 and FC-5) and three additional sites added to the Left Fork of Fish Creek (FC-6, FC-7 and FC-8).

Table 7-14 Water Monitoring Matrix: Operational Phase of Mining on page 7-53 provides a comprehensive list of all the proposed monitoring sites. Plate 7-4 Water Monitoring depicts the locations of the monitoring sites.

Flows will be determined by direct measurement (depth times width times 2/3 velocity), by use of portable or stationary weirs or flumes. Qualified personnel following standard procedures with calibrated instruments will take measurements.

Replacement of State Appropriated Water Supply

The application meets the hydrology Operation Plan requirements for State Appropriated Water Supply replacement as provided in **R645-301-731.530**

Beginning on page 7-61 and continuing through page 7-61F, the Permittee outlines the measures and mitigation efforts that will be utilized in the event that a state appropriated water supply is impacted by mining activity. On page 7-61, the Permittee states, "If a state appropriated water supply is impacted by mining and/or mining related activities, C.W. Mining will replace it as required under R645-301-731.530 of the Utah State Code. Also in accordance with federal lease stipulation 21, if any water resource that has been identified for protection is impacted, C.W. Mining will replace the water resource". The Permittee provides the locations for state appropriated water rights with points of diversion within the proposed permit expansion area on Plate 7-12. In addition, all water resources identified for protection by the U.S. Forest Service are shown on Figure 5C-3. On page 7-48 of the submittal, the Permittee states, "If any state appropriated water rights are impacted in the future, C.W. Mining will meet with the water right holder and the Division and develop a site specific water replacement plan".

The Permittee identifies C.O.P. Coal Development, ANR Inc., the United States Forest Service and Huntington, Cleveland Irrigation Company (HCIC) as the primary water rights holders that could potentially be impacted by underground mining activity. On page 7-61C, the Permittee provides a discussion as to possible measures and mitigation efforts that could be taken in the event that a state appropriated water supply is impacted by mining activity.

As discussed during the permitting process, the USDA Forest Service would need their water replaced at the source of the flow in the event that there were mining related impacts. The

Permittee commits to utilizing pond liners, grouting or other technologies available to repair any cracks that could potentially impact water resources. The Permittee commits to replacing the water at its source. If the impact was a displaced spring, the Permittee has committed to installing guzzlers, wells or other available technology to restore the water.

On page 7-61E, the Permittee discusses possible mitigation efforts in the event that HCIC's water rights are impacted. HCIC's points of diversion for their state appropriated water rights are located downstream of the subsidence area. Because of this, the stock-watering and irrigation uses for HCIC may not require replacement at the source of the flow. HCIC has indicated; however, that they would require the same quantity of water to reach their points of diversions. The Permittee states, "If stock watering or irrigation water were impacted, C.W. Mining would transfer or retire enough of their shares in HCIC to cover the lost water, or any course of action agreed upon between C.W. Mining and HCIC". The Permittee commits to replacing lost flow with equivalent flow from existing springs that they hold water rights on.

It is outlined on page 7-61F that the requirement to replace water would be contingent upon the Division making a finding that a state appropriated water supply or protected water resource was contaminated, diminished or interrupted by underground coal mining and reclamation activities.

Findings:

Hydrologic information for the Operational Plan regulations does not meet the minimum requirements of the State of Utah R-645 Coal Mining Rules relative to Surface and Ground Water monitoring. The following deficiencies should be addressed:

- The Permittee should clarify the sampling duration/frequency to be performed during the operational phase of mining activity. Specifically, the Permittee needs to alter the sampling duration language under Operational Monitoring in Table 7-12, Ground Water Sampling, on page 7-51 and in Table 7-16, Surface Water Sampling, on page 7-58 to show that the proposed monitoring includes four sampling events per year (as shown in Table 7-14).

- The Permittee should include ground water sites SBC-16, SBC-16A and SBC-16B to the list of sites slated for increased monitoring during the undermining of Fish Creek. The sites should reflect their increased monitoring status in Table 7-14 as well as on page 7-56.

- The Permittee should add the following locations to their ground water monitoring program. Table 7-14 as well as related text portions in the surface and ground water monitoring sections of the MRP should be up-dated to reflect these additional monitoring points:
    - South McCadden Trough-located in the T 16S R7E SE ¼ of the SW ¼ of Section 11as depicted in Figure 7-0, Forest Service Protected Water Resources. The

Permittee should address discrepancy between Figure 7-0 and the text on page 7-61A. Page 7-61A states the South McCadden Trough as being monitored with site SMH-1. However, the location of SMH-1 as depicted on Plate 7-4 does not correlate with the location of the South McCadden Trough as depicted on Figure 7-0.

- Historical monitoring location FBC-12.

- The Permittee should address a discrepancy on Plate 7-4 as it relates to monitoring site SBC-12 (16-7-13-1). Plate 7-4 depicts a historical monitoring point directly south of SBC-12 (16-7-13-1) identified as 16-7-13-1 in green type.

- The Permittee should add the following location to their surface water monitoring program:
  - A stream monitoring location in McCadden Hollow up-stream of spring SMH-4 and south of historical monitoring site 16-7-12-6.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Monitoring and Sampling Location Maps

The application meets the hydrology requirements for Maps, Plans and Cross Sections of Mining Operations for Monitoring and Sampling Location maps as provided in **R645-301-731**.

Plate 7-4, Water Monitoring, depicts the current water monitoring points as well as the water monitoring points the Permittee has proposed in the lease expansion. Plate 7-12, Water Rights, depicts the state appropriated water rights that have been identified in the Utah Division of Water Rights Database, as well as water resources identified during field investigation. The water rights plate depicts the points of diversion associated with the specific water rights.

It is the understanding of the Division that the Utah Water Rights Division is compiling an addendum to the state appropriated water rights in the area. During field investigations, several water resources were discovered that were not identified by the Permittee. The water resources identified by water users/stakeholders as important or protected, have been slated for monitoring and are depicted as active monitoring sites on Plate 7-4. However, in several instances, a state appropriated water right ID# has not been assigned. The addendum process currently underway by the Water Rights Division will serve to provide a more complete list of the water rights in the proposed lease expansion.

During an August 22nd, 2006 site visit to the proposed lease expansion, several hydrologic resources were identified as areas to be monitored. These areas include: Wild Horse Spring (T16S R7E Sect 13 SE1/4), two springs identified in the field as SBC-16A and SBC-16B

(T16S R8E Sect 19 NE1/4 NW1/4) and the spring located in T16S R7E Sect 12 NW1/4 SE1/4. These sites have been added to Plate 7-4 as active monitoring sites.

Findings:

Hydrologic information for the Maps, Plans and Cross Sections of Mining Operations meets the minimum requirements of the State of Utah R-645 Coal Mining Rules.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The application meets the Reclamation Plan for the Hydrologic Reclamation Plan as provided in **R645-301-731.600**. No update to the existing hydrologic reclamation plan was submitted because no new surface disturbance is planned for the proposed lease expansion area.

Findings:

The information provided meets the minimum hydrology requirements for the Reclamation Plan of the State regulations.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-729.

Analysis:

The application does not meet the requirements of the Cumulative Hydrologic Impact Assessment (CHIA) as provided in **R645-301-729**. The hydrologic information provided in the application is not adequate to update the CHIA. The hydrologic deficiencies listed in this technical memo need to be addressed by the Permittee before the CHIA can be updated.

Findings:

The Cumulative Hydrologic Impact Assessment information does not meet the minimum requirements of the Coal Mining Rules. Before the application can be approved, the following deficiencies should be addressed:

R645-301-729, The Permittee needs to address the hydrologic deficiencies listed in this technical memo (Task ID #2292) before the Division can update the Gentry Mountain Cumulative Hydrologic Impact Area with information regarding the proposed lease additions.

RECOMMENDATIONS:

Hydrologic information provided in the application does not meet the requirements of the Coal Mining Rules. The proposed amendment should not be at this time.

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